

WHAT IS CLAIMED IS:

1. A radio frequency (RF) receiver for a code division multiple access (CDMA) mobile communication base station system, which has a plurality of receive blocks for receiving RF signals via a plurality of antennas, and a plurality of FA-based channel cards, the RF receiver comprising:

an analog down-converting means for down-converting multi-FA RF signals on the respective reception paths output from the plural receive blocks to intermediate frequency (IF) signals; and

- 10 a digital down-converting means for converting the IF signals of 3 FA's on the respective reception paths output from the analog down-converting means to digital signals by reception paths, dividing the digital signals into in-phase (I) and quadrature (Q) channels of the FA's on the respective reception paths to down-convert the digital signals to I/Q channel baseband signals, and generating the FA-based I/Q channel
- 15 baseband signals to the channel cards corresponding to the respective FA's.

2. The RF receiver as claimed in claim 1, wherein the analog down converting means comprises:

- 20 a local oscillator on the individual reception paths for generating a local frequency;

a mixer on the individual reception paths for mixing the local frequency generated from the local oscillator with the multi-FA RF signals on the individual reception paths output from the plural receive blocks to generate multi-FA IF signals on the individual reception paths; and

an SAW filter on the individual reception paths for limiting the band of the multi-FA IF signals on the individual reception paths output from the individual mixer to the bandpass of a bandwidth corresponding to the multi-FA bandwidth.

5           3.       The RF receiver as claimed in claim 2, wherein the multiple FA's are 3 FA's, the IF frequency on the individual reception paths of "0" and "1" is 70 MHz, and the bandwidth of the SAW filter is 3.75 MHz corresponding to the 3 FA's.

10           4.       The RF receiver as claimed in claim 1, wherein the digital down-converting means comprises:

an analog-to-digital converter on the individual reception paths for converting the IF signals output from the analog down-converters to digital signals;

15           a FA-based digital unit on the individual reception paths for dividing the digital signals output from each analog-to-digital converter into the FA-based I/Q channels on the individual reception paths to perform QPSK demodulation and down-converting the I/Q channel digital signals to I/Q channel baseband signals; and

a multiplexer for multiplexing the reception paths and the I/Q channel baseband signals output from the FA-based digital unit and generating the multiplexed digital signals to the channel cards corresponding to the respective FA's.

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5.       The RF receiver as claimed in claim 4, wherein the digital unit comprises:

a first reception path 0FA digital unit for converting the digital signals output from the analog-to-digital converter corresponding to the first reception path to the I/Q

channel baseband signals assigned to 0FA;

a first reception path 1FA digital unit for converting the digital signals output from the analog-to-digital converter corresponding to the first reception path to the I/Q channel baseband signals assigned to 1FA;

5 a first reception path 2FA digital unit for converting the digital signals output from the analog-to-digital converter corresponding to the first reception path to the I/Q channel baseband signals assigned to 2FA;

a second reception path 0FA digital unit for converting the digital signals output from the analog-to-digital converter corresponding to the second reception path  
10 to the I/Q channel baseband signals assigned to 0FA;

a second reception path 1FA digital unit for converting the digital signals output from the analog-to-digital converter corresponding to the second reception path to the I/Q channel baseband signals assigned to 1FA; and

a second reception path 2FA digital unit for converting the digital signals  
15 output from the analog-to-digital converter corresponding to the second reception path to the I/Q channel baseband signals assigned to 2FA.

6. The RF receiver as claimed in claim 4, wherein the individual FA-based digital unit comprises:

20 a channel divider for dividing the digital signals output from the analog-to-digital converter on the corresponding reception paths into I and Q channels for QPSK demodulation at the digital unit on the respective reception paths;

a local oscillator for generating a local frequency;

a mixer for mixing the local frequency generated from the local oscillator with

the divided I/Q channel signals to convert the I/Q channel signals to I/Q channel baseband signals; and

a digital FIR filter for band-pass filtering the respective reception paths and the FA-based I/Q channel baseband signals output from the mixer and generating the  
5 band-limited baseband signals to the multiplexer.

7. The RF receiver as claimed in claim 4, wherein the multiplexer multiplexes:

the I/Q channel baseband signals output from the first reception path 0FA  
10 digital unit and the I/Q channel baseband signals output from the second reception path 0FA digital unit;

the I/Q channel baseband signals output from the first reception path 1FA digital unit and the I/Q channel baseband signals output from the second reception path 1FA digital unit; and

15 the I/Q channel baseband signals output from the first reception path 2FA digital unit and the I/Q channel baseband signals output from the second reception path 2FA digital unit, and

generates the multiplexed signals to the channel cards corresponding to the respective FA's.

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8. An RF receiver for a CDMA mobile communication base station system, which has two receive blocks for receiving RF signals via two antennas, and FA-based channel cards, the RF receiver comprising:

an analog down-converter for down-converting multi-FA RF signals on first

and second reception paths output from the two receive blocks to IF signals;

two analog-to-digital converters for converting the down-converted IF signals on the first and second reception paths from the analog down-converter to digital signals;

- 5 FA-based digital units on the first and second reception paths for dividing the digital signals output from the two analog-to-digital converters into FA-based I and Q channels on the first and second reception paths to perform QPSK demodulation, and down-converting the I/Q channel digital signals to baseband signals; and

- 10 a multiplexer for multiplexing the first and second reception paths and the I/Q channel baseband signals on the first and second reception paths output from the FA-based digital units and generating the multiplexed digital signals to the channel cards corresponding to the respective FA's.